Catalogue of American Amphibians and Reptiles.

Brandon, R.A. 1992. *Ambystoma dumerilii.*

Ambystoma dumerilii (Dugès)
Achoque, Achoque de Agua, Lake Pátzcuaro Salamander

Siredon Dumerilii Dugès, 1870:241. Type-locality, "... la Laguna de Pátzcuaro..." Michoacán, México. Dugès designated no types, but four specimens - ANSP 13862, USNM 16201-2, and a specimen in the Museo Alfredo Dugès, Universidad de Guanajuato, México - are considered to be syntypes (Dunn, 1939; Taylor, 1940; Maldonado-Koerdell, 1948a, b; Smith and Necker, 1944). Descriptions and illustrations in Dugès (1870, 1872) indicate at least one syntype of each sex. Syntypes not examined by author, but photographs of USNM syntypes examined; existence of syntype ANSP 13862 confirmed by John E. Cadle. See Comment.

Siredon dumerili: Smith, 1877:56.

Amblystoma dumerili: Cope, 1887:7.

S[iredon]. dumérili: Cope, 1889:7.

Ambystoma dumerili: Bailey, 1904:69.

Amblystoma dumerilii: Galindo y Villa, 1927:209.

Ambystoma dumerilii: Lafrentz, 1927:162.

Ambystoma dumereli: Scharlinski, 1939:54.

Bathysiredon dumerilii: Dunn, 1939:1. Placed in monotypic new genus.

Bathysiredon dumerili: Martín del Campo y Sánchez, 1940:486.

Amblystoma dumereli: Taylor, 1947:576.

Amblystoma dumerli: Taylor, 1947:576.

Bathysiredon dumerilii dumerilii: Maldonado-Koerdell, 1948a:195.

Bathysiredon dumerilii queretarensis Maldonado-Koerdell, 1948a: 199. Type-locality, "San Juan del Río (Qro.)." Two apparently unnumbered syntypes collected by Alfredo Dugès are in the Museo Alfredo Dugès, Universidad de Guanajuato, México. According to Maldonado-Koerdell, 1948a:200, "Ambos son larvas bien desarrolladas, cuyas cloacan no tienen los labios hinchados" [both are well-developed larvae, whose cloacas do not have swollen lips]. Syntypes not examined, but see Comment.

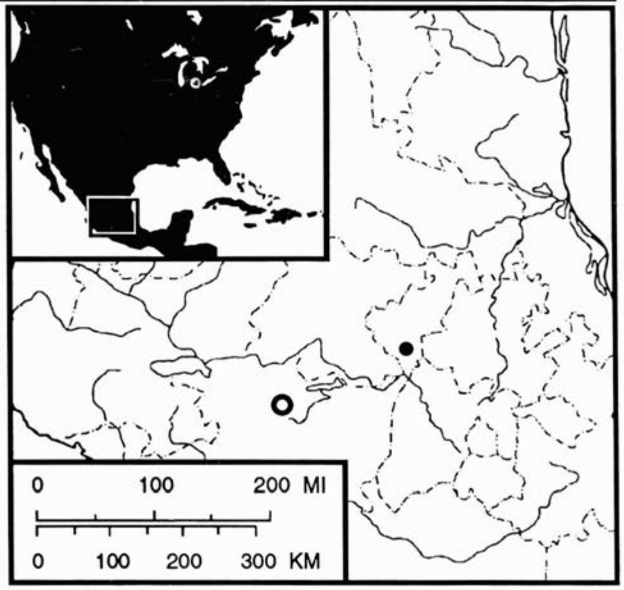
Ambystoma dumerili queretarensis: Tihen, 1958:44.

Ambystoma dumerili dumerili: Duellman, 1961:15.

Ambystoma dumerilii dumerilii: Brame, 1967:10.

Ambystoma dumerilii queretarensis: Brame, 1967:10.

Ambystoma dumerillii: Collette and King, 1973:391.



Map. The type-locality, Lake Pátzcuaro, Michoacán, indicated by the large open circle, is the only confirmed population of *Ambystoma dumerilii.* San Juan del Río, Queretaro, the only other purported locality and type-locality of Maldonado-Koerdell's *A. d. queretarensis* (see Comment), is indicated by the smaller solid circle.

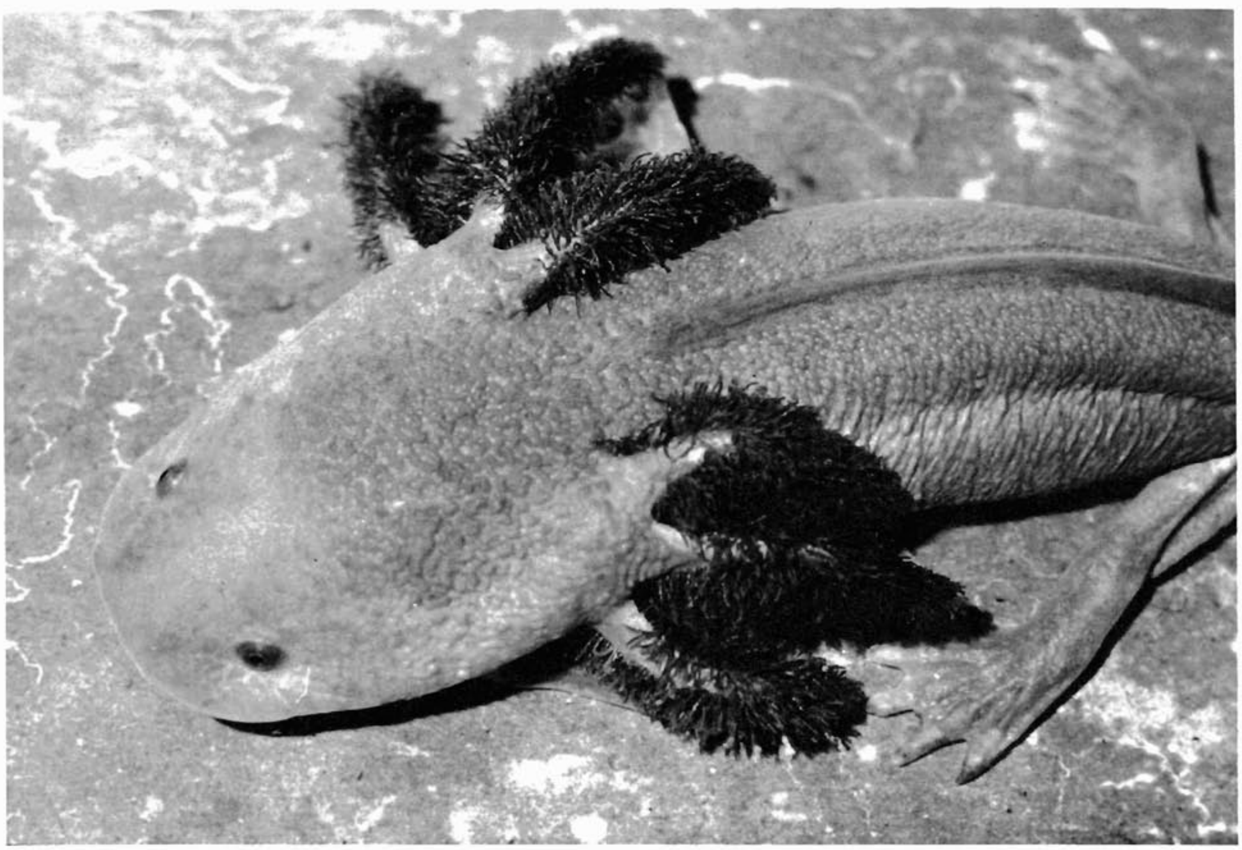


Figure 1. Adult female *Ambystoma dumerilii*, 140 mm SVL (from Brandon, Copeia 1970:385, fig. 1; used with permission).

Ambystoma dumerillii dumerillii: Gorham, 1974:28.
Ambystoma dumerillii queretarensis: Gorham, 1974:28.
Ambystoma queretarensis: Smith and Smith, 1976:C-A-2. Considered a different species from *A. dumerilii.*
Ambystoma queretarense: Frost, 1985:554.

• **Content.** Two subspecies have been recognized by some authors, *A. d. dumerilii* and *A. d. queretarensis,* but the latter probably was described from specimens with incorrect locality data. See Comment.

• **Definition and Diagnosis.** This large (reach maturity when 115-120 mm SVL and reach 170 mm SVL), robust, broad-headed, paedomorphic, and perennibranchiate (does not transform in nature) species of *Ambystoma* is distinguishable from all other *Ambystoma* by: a broad and flattened head; uniformly tan to brown coloration; hyperfilamentous gills (the distinctive dorsal gill fimbriae are acquired by larvae at 30-35 mm SVL); short, extensively webbed digits; three phalanges in the fourth hind toe; a conspicuous keel on the posterior margin of the hind feet; and moderately few (16-26, $\bar{x}$ = 21) gill rakers on the anterior face of the third gill-bearing arch.

• **Descriptions.** Dugès (1870, 1872) provided descriptions and sketches of external morphology and internal anatomy. Taylor (1940) provided tooth counts, various head and body dimensions, and descriptions of tail and foot morphology for three USNM specimens, including two syntypes. Tihen (1958) reviewed the distinctive features of the species. Brandon (1970a, b) described size range, size at maturity, spermatophores, and eggs. Brandon (1972, 1977) described larval development and laboratory hybrids with *A. mexicanum* and a variety of other species of *Ambystoma.* Brandon et al. (1974) described sperm morphology of this and three other species, and of hybrids among them. Brandon (1976) described induced and spontaneously metamorphosed animals. Shaffer (1984b) provided morphometric data and growth trajectories. Zalisko et al. (1984) compared diameters of spermatozoan cytoplasmic droplets in spermatophores with those of a variety of other salamanders. Krebs and Brandon (1984) compared foot morphology, number of gill rakers, metamorphic response, and egg size and color in *A. dumerilii* with several other Mexican *Ambystoma.* Gomez Ríos (1989) described the male reproductive tract and histological details of the spermatogenic cycle.

• **Illustrations.** Dugès' (1870, 1872) descriptions were accompanied by sketches. Maldonado-Koerdell (1948a, b) photographed the syntype in the Dugès Museum. An excellent photograph of an entire animal, showing distinctive features of the feet and gills, appeared in Fauna (1971:37). Brandon illustrated a live adult (1970a), a larva (1976), a hatchling (1972), a spermatophore and eggs (1970b), individuals undergoing metamorphosis (1976), and F_1 hybrids with *A. mexicanum, A. tigrinum,* and *A. talpoideum* (1972, 1977). Krebs and Brandon (1984) included comparative sketches of foot morphology. Lauder and Shaffer (1985) illustrated the skull and musculature of the head and pectoral region. Duellman and Trueb (1986) included a photograph of the head and gills. Gomez Ríos (1989) provided excellent color photographs of the testis and histological details of the spermatogenic cycle.

• **Distribution.** *Ambystoma dumerilii* is known only from Lake Pátzcuaro, a large (ca. 111 km^2), moderately shallow (to 15 m), relatively high-elevation (2035 m) lake (Buen, 1944) at the southern edge of the Mexican Plateau in Michoacán, México. Some Dugès specimens sometimes said to be from San Juan del Río, Queretaro (not Guanajuato, as pointed out by Maldonado-Koerdell, 1948a) probably originated from Lake Pátzcuaro (Taylor, 1940; Tihen, 1958). See Comment.

• **Fossil Record.** None.

• **Pertinent Literature.** Brandon (1970a) described the breeding season (December through spring) and (1970b) courtship behavior. Gallien and Aimar (1974) examined nucleocytoplasmic incompatibility in hybrids obtained by transplanting *A. dumerilii* nuclei into *A. mexicanum* eggs. Brandon (1976) described the fatal consequences of metamorphosis in the laboratory. Feder et al. (1982) listed body temperatures in the field. Shaffer (1984a, b) examined the evolutionary relationships of *A. dumerilii* and other Mexican ambystomatids within the context of the evolution of paedomorphosis and changes in body morphology. Shaffer and Lauder (1985a, b) and Lauder and Shaffer (1985) examined the functional morphology of feeding. Shaffer (1986) referred to *A. dumerilii* in a case study of character weighting in phylogenetic analysis. Brandon (1989) and Shaffer (1989) mentioned *A. dumerilii* within the context of other Mexican species of *Ambystoma,* particularly *A. mexicanum.*

• **Remarks.** Dunn (1939) considered this species so distinctive that he established a new genus, *Bathysiredon,* for it. Workers from Tihen (1958) on, however, have preferred to treat it as a species of *Ambystoma.* Breeding experiments (Brandon, 1972, 1977) and genetic distance data (Shaffer, 1984a) showed that it might best be considered a member of the *Ambystoma tigrinum* species group.

Prematurely considered to have been brought to extinction by introduced game and food fishes (Smith and Taylor, 1948), *A. dumerilii* was present in the 1950-60's (Duellman, 1961) and was abundant in the early 1970's. Lazcano-Barrero et al. (1988) considered the species in danger of extinction from habitat destruction and local exploitation by fishermen, and Flores Villela and Gerez (1988) also listed it as endangered. Siltation of Lake Pátzcuaro has been suggested as a major threat by Shaffer (1989). *Ambystoma dumerilii* has been listed in CITES Appendix II since 1975 (Code of Federal Regulations, 1991).

The Achoque is a familiar animal to local residents and fishermen who exploit it for food and folk medicine. Recipes by which they are prepared for consumption were given by Liner (1978) and Calderón and Rodríguez (no date).

• **Etymology.** The species was named in honor of Auguste Dumèril, professor of herpetology and ichthyology, Muséum d'Histoire Naturelle, Paris. The common name "Achoque" is the Tarascan language equivalent of the Nahuatl "Axolotl," and the Spanish "Ajolote." Like the common name Axolotl, the name Achoque often is applied locally to any large branchiate salamander. Sometimes the species is called "Achoque de agua" to distinguish it from terrestrial forms.

• **Comment.** The status of *A. d. queretarensis* (Maldonado-Koerdell, 1948a) has been questioned and is puzzling on two points (summarized in Frost, 1985). Confusion has surrounded both the identity and the collection locality of two San Juan del Río, Queretaro, specimens labeled *Siredon dumerilii* in the Museo Alfredo Dugès, Universidad de Guanajuato, that were designated syntypes of *Bathysiredon dumerilii queretarensis* by Maldonado-Koerdell (1948a). Smith and Necker (1944) examined the specimens and identified them as larvae of *Ambystoma,* rather than *Bathysiredon dumerilii.* According to Maldonado-Koerdell (1948a), Smith and Necker left a note in the jar indicating the specimens belonged to "... una posible especie nueva del género *Ambystoma,* ..." (a possibly new species of the genus *Ambystoma*), thus confirming they both had examined the same specimens. Tihen (1958) treated *A.* (*Bathysiredon*) *d. queretarensis* as a valid subspecies but said *Bathysiredon* was known only from Lake Pátzcuaro. Smith and Smith (1976) considered the occurrence of *A. dumerilii* near San Juan del Río highly unlikely and suggested that the Dugès specimens either bear erroneous locality data (actually coming from Lake Pátzcuaro) or represent another species of *Ambystoma.* They suggested treating *Ambystoma queretarensis* provisionally as a separate species, a position with which Frost (1985) disagreed. This taxon was not recognized by Flores and Gerez (1988). Direct examination should establish whether or not the two Dugès Museum specimens represent the distinctive *A. dumerilii.* Nor would understanding how they might have become associated with erroneous locality information be difficult. A similar error occurred with syntypes USNM 16201-16202. In the USNM they were catalogued originally as being from Guanajuato, from where Dugès sent them. A copy of Dugès' original list of specimens sent to the USNM (provided by Robert P. Reynolds), however, lists the specimens as being from "Lac de Pátzcuaro," and the USNM catalogue entry subsequently was corrected. Taylor (1940) thought "... it seems certain that this specimen [syntype USNM 16201] originated in Lake Pátzcuaro and was sent to the U.S. National Museum from the Guanajuato locality by Dugès." Further evidence of early confusion is Cope's (1889) comment that "A second species, the *S. dumérili,* has been described by Dugés [sic] from Lake Patzcuaor [Pátzcuaro] in the State of Guanajuato."

According to Reynolds (pers. comm.), female syntype USNM 16201 (Dugès field number 168) has head and body dimensions exactly as reported by Dugès (1870) and is full of tiny eggs as shown in his figure 1, plate 5; and syntype USNM 16202 is a male measuring

ca. 130 mm snout to anterior end of vent. Without more convincing evidence to the contrary, all specimens of this distinctive species should be considered to have come from Lake Pátzcuaro.

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